

ABSTRACT

A semiconductor device includes a substrate having an insulating film on its surface, and an active layer made of a semiconductive thin film on the substrate surface. The thin film contains a mono-domain region formed of multiple columnar and/or needle-like crystals parallel to the substrate surface without including crystal boundaries therein, allowing the active layer to consist of the mono-domain region only. The insulating film underlying the active layer has a specific surface configuration of an intended pattern in profile, including projections or recesses. To fabricate the active layer, form a silicon oxide film by sputtering on the substrate. Pattern the silicon oxide film providing the surface configuration. Form an amorphous silicon film by low pressure CVD on the silicon oxide film. Retain in the silicon oxide film and/or the amorphous silicon film certain metallic element for acceleration of silicon film to a crystalline silicon film. Then, perform a second heat treatment in the halogen atmosphere forming on the crystalline silicon film a thermal oxide film containing halogen, whereby the crystalline silicon film alters to a mono-domain region.